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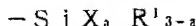
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(54) ROOM-TEMPERATURE-VULCANIZABLE COMPOSITION

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain a vulcanizable composition having very rapid surface curability and developing surface weather resistance by using a polymer having specified hydrolyzable silicon groups, an air-curable compound and/or photocurable compound as the essential components.

SOLUTION: This composition is a room-temperature-vulcanizable one consisting essentially of a polymer having hydrolyzable groups of the formula, said polymer at least partially consisting of a polymer having hydrolyzable groups of the formula (wherein a is 3), and an air-curable compound and/or a photo-curable compound. In the formula, R1 is a 1-20C monovalent organic group; X is OH or a hydrolyzable group. The air-curable compound used is desirably a compound having an unsaturation undergoing polymerization under the influence of atmospheric oxygen and is desirably a liquid diene polymer, an oil from modification thereof, or the like. The photocurable compound is typified by an unsaturated acrylic compound, polyvinyl cinnamate, an azided resin, and the like, among which the unsaturated acrylic compound is particularly desirable.



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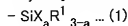
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CLAIMS

[Claim(s)]

[Claim 1]It is a polymer which has a hydrolytic silicon group expressed with a following formula (1). A room-temperature-curing nature constituent in which some or all of this polymer uses as an essential ingredient a polymer (A), a curing-in-air compound (K), and/or a photoresist compound (L) which are the polymers which have a hydrolytic silicon group which is 3 in a of a formula (1).



(R¹ shows a univalent organic group substitution of the carbon numbers 1-20, or unsubstituted among a formula (1), X shows a hydroxyl group or a hydrolytic basis, and a shows 1, 2, or 3.) however, when those R¹ may be the same, or may differ, when two or more R¹ exist, and two or more X exists, those X may be the same or may differ.

[Claim 2]The room-temperature-curing nature constituent according to claim 1 whose molecular weights of a polymer (A) are 8000-50000.

[Claim 3]The room-temperature-curing nature constituent according to claim 1 or 2 which is a polyoxyalkylene polymer (B) in which a polymer (A) has a hydrolytic silicon group expressed with a formula (1).

[Claim 4]The room-temperature-curing nature constituent according to claim 3 whose molecular-weight-distribution M_w/M_n of a polyoxyalkylene polymer (B) is 1.7 or less.

[Claim 5]A polyoxyalkylene polymer (B) at the end of a polyoxyalkylene polymer produced under existence of an initiator by polymerizing cyclic ether by making a composite metal cyanide complex into a catalyst. The room-temperature-curing nature constituent according to claim 3 or 4 which is a polymer produced by introducing a hydrolytic silicon group expressed with a formula (1).

[Claim 6] A polyoxyalkylene polymer (B) is obtained by polymerizing cyclic ether under existence of an initiator. The room-temperature-curing nature constituent according to claim 3, 4, or 5 which is a polymer produced by molecular-weight-distribution M_w/M_n introducing a hydrolytic silicon group expressed with a formula (1) into an end of a polyoxyalkylene polymer which is 1.7 or less.

[Claim 7]The room-temperature-curing nature constituent according to claim 3, 4, 5, or 6 in which a polyoxyalkylene polymer (B) contains a polymer (D) further produced by polymerizing a polymerization nature unsaturation group content monomer (C).

[Claim 8]The room-temperature-curing nature constituent according to claim 3, 4, 5, or 6 in which a polyoxyalkylene polymer (B) contains a polymer (D) further produced by polymerizing a polymerization nature unsaturation group content monomer (C) in a polyoxyalkylene polymer (B).

[Claim 9]The room-temperature-curing nature constituent according to claim 7 or 8 which is a monomer which has a hydrolytic silicon group which a part or all of a polymerization nature unsaturation group content monomer (C) has a polymerization nature unsaturation group, and is expressed with a glycidyl group and/or a formula (1).

[Claim 10]Claims 1, 2, 3 and 5 which are the polymers in which some or all of a polymer (A) has simultaneously a hydrolytic silicon group whose a in a hydrolytic silicon group whose a in a formula (1) is 1 or 2, and a formula (1) is 3, a room-temperature-curing nature constituent given in 6, 7, 8, or 9.

[Claim 11]Claims 1, 2, 3 and 5 in which a polymer (A) contains both polymers which has a hydrolytic silicon group whose a in a polymer in which a in a formula (1) has a hydrolytic silicon group which is 1 or 2, and a formula (1) is 3, a room-temperature-curing nature constituent given in 6, 7, 8, or 9.

[Claim 12]Claims 1, 2, 3 and 5 whose polymer (A) is a polymer which has only a hydrolytic silicon group whose a in a formula (1) is 3 as a hydrolytic silicon group, a room-temperature-curing nature constituent given in 6, 7, 8, or 9.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the hardenability constituent hardened under hygroscopic-surface-moisture existence.

[0002]

[Description of the Prior Art]The polyoxyalkylene polymer which has a hydrolytic silicon group at the end employs efficiently the feature that a hardened material has rubber elasticity, and is used for the use of a coating composition, a seal constituent, etc.

[0003]

[Problem to be solved by the invention]The method of making an end harden various kinds of polymers which have a hydrolytic silicon group, and using it for sealant, adhesives, etc. is known well, and is a useful method industrially. The polymer especially whose main chain is polyoxyalkylene among such polymers is liquefied at a room temperature, and when a hardened material holds pliability also at low temperature comparatively and uses for sealant, adhesives, etc., it is provided with the desirable characteristic.

[0004]. As a polymer of such hygroscopic-surface-moisture hardenability, are indicated to JP,61-18582,B, JP,3-72527,A, or JP,3-47825,A. The polymer which has a hydrolytic silicon group which is a polymer which has a hydrolytic silicon group at the end, and two hydrolytic bases per silicon atom combine in order to hold elongation and pliability, it is the polymer which is indicated to JP,58-10418,B and JP,58-10430,B and which has a hydrolytic silicon group which three hydrolytic bases per silicon atom combine -- a molecular weight -- 6000 or less -- the polymer of low molecular weight is known comparatively.

[0005]However, when such a polymer is used at the use etc. and low temperature of adhesives etc., To take [when you need a very quick cure rate especially, the cure rate is not enough, and] out the pliability after hardening. Crosslinking density needed to be reduced, therefore since crosslinking density was not enough, there was stickiness (surface tackiness), and there was a problem that a crack went into the surface easily in the long run by weathering degradation. In order to solve this problem, A photoresist compound and a curing-in-air compound. The method of adding JP,62-26349,B. It is tried by JP,1-198661,A, JP,2-117954,A, JP,3-160053,A, JP,5-70531,A, JP,5-65400,A, JP,5-65407,A, JP,7-196909,A, JP,8-269315,A, etc., The example which uses the narrow polymer of molecular weight distribution especially for JP,5-65400,A and JP,5-65407,A is indicated. However, these publicly known examples were substantially difficult to only know the example in the monoalkyl dialkoxy silyl group as a hardenability functional group, and to make a cure rate quick in such a case.

[0006]As mentioned above, a presentation which can improve the very quick hardening characteristic and surface weatherability without worsening the pliability and workability greatly was desired to the polymer which has a hydrolytic silicon group.

[0007]

[Means for solving problem]This invention is the following invention about a room-temperature-curing nature constituent which was extremely excellent in the hardening characteristic and surface weatherability by using a specific curing-in-air compound and a photoresist compound.

[0008]It is a polymer which has a hydrolytic silicon group expressed with a following formula (1). A room-temperature-curing nature constituent in which some or all of this polymer uses as an essential ingredient a polymer (A), a curing-in-air compound (K), and/or a photoresist compound (L) which are the polymers which have a hydrolytic silicon group which is 3 in a of a formula (1).

[0009]— $\text{Si}_x\text{R}^1_{3-x} \dots (1)$

(R^1 shows a univalent organic group substitution of the carbon numbers 1–20, or unsubstituted among a formula (1), X shows a hydroxyl group or a hydrolytic basis, and a shows 1, 2, or 3,) however, when those R^1 may be the same, or may differ, when two or more R^1 exist, and two or more X exists, those X may be the same or may differ.

[0010](Polymer (A)) In this invention, although polyoxyalkylene, polyester, polycarbonate, polyolefine, etc. are mentioned as a main chain of a polymer (A), especially a thing that a main chain consists of polyoxyalkylene intrinsically is preferred. Hereafter, a main chain represents and explains a polymer (henceforth a polyoxyalkylene polymer (B)) which is polyoxyalkylene among polymers (A).

[0011](Polyoxyalkylene polymer (B)) A polyoxyalkylene polymer (B) which has a hydrolytic silicon group expressed with a formula (1) is proposed by JP,3-47825,A, JP,3-72527,A, JP,3-79627,A, etc., for example. As for a polyoxyalkylene polymer (B), it is preferred to use as a raw material a polyoxyalkylene polymer which has a functional group, to make it not pass to the end via an organic group, to introduce a hydrolytic silicon group and to be manufactured so that it may state below.

[0012]As a raw material polyoxyalkylene polymer, a thing of a hydroxyl group end which makes cyclic ether etc. react and is manufactured is preferred under existence of a catalyst and existence of an initiator. As an initiator, a hydroxy compound etc. which have one or more hydroxyl groups can be used. As cyclic ether, ethylene oxide, propylene oxide, butylene oxide, hexyleneoxide, a tetrahydrofuran, etc. are mentioned. As a catalyst, alkaline metal catalysts, such as a potassium system compound and a caesium system compound, a composite metal cyanide complex catalyst, a metalloporphyrin catalyst, etc. are mentioned.

[0013]In this invention, it is preferred to use a polyoxyalkylene polymer of the amount of polymers of the molecular weights 8000–50000 as a raw material polyoxyalkylene polymer. Therefore, by [which manufactured using an alkali catalyst etc.] making many halogenated compounds, such as a methylene chloride, react to a polyoxyalkylene polymer of low molecular weight comparatively. It is preferred to use a polyoxyalkylene polymer manufactured using a polyoxyalkylene polymer and a composite metal cyanide complex catalyst which are acquired by quantifying many.

[0014]moreover — especially — the ratio of weight average molecular weight (M_w) and a number average molecular weight (M_n) — it being preferred that M_w/M_n uses 1.7 or less polyoxyalkylene polymer, and, As for M_w/M_n , it is still more preferred that it is 1.6 or less, and, as for M_w/M_n , it is preferred that it is especially 1.5 or less.

[0015]The polyoxyalkylene polymer (B) which has a hydrolytic silicon group of this invention is obtained by denaturalizing and using an end group as a hydrolytic silicon group further, by using such a polyoxyalkylene polymer as a raw material. When the polyoxyalkylene polymer (B) obtained considering it as a raw material is stiffened so that M_w/M_n of a raw material polyoxyalkylene polymer is small, the elongation of a hardened material serves as high intensity greatly, and the viscosity of a polymer becomes low, and what has a the same elastic modulus is excellent in workability. Especially in such a polyoxyalkylene polymer, make a composite metal cyanide complex into a catalyst, and Under existence of an initiator, Especially the thing produced by polymerizing alkylene oxide is preferred, and what denaturalized and used the end of such an alkylene oxide polymer as the hydrolytic silicon group is the most preferred.

[0016]The complex which uses zinc hexa cyanocobaltate as the main ingredients as a composite metal cyanide complex is preferred, and ether and/or an alcoholic complex are especially preferred. The presentation can use what is intrinsically indicated to JP,46-27250,B. In this case, as ether, ethyleneglycol dimethyl ether (glyme), diethylene glycol dimethyl ether (jig lime), etc. are preferred, and especially glyme is preferred from a point of the handling at the time of manufacture of a complex. As alcohol, t-butanol is preferred.

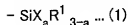
[0017]As for the functional group number of a raw material polyoxyalkylene polymer, two or more are preferred. As for especially the functional group number of a raw material polyoxyalkylene polymer, 2 or 3 is preferred to enlarge pliability as the hardened material characteristic. As for especially the functional group number of a raw material polyoxyalkylene polymer, when acquiring a good adhesive property and hardenability, 3–8 are preferred.

[0018]As a raw material polyoxyalkylene polymer, the copolymer of a polyoxyethylene, polyoxypropylene, polyoxy butylene, polyoxy hexylene, polyoxy tetramethylen, and two or more sorts of cyclic ether is specifically mentioned.

[0019]Especially a desirable raw material polyoxyalkylene polymer is a polyoxypropylene polyol of 2–6 value, and are polyoxypropylene diol and polyoxypropylene triol especially. When using for a method of the following (b) or

(**), a polyoxyalkylene polymer of olefin ends, such as an allyl end polyoxypropylene monooar, can also be used.

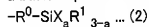
[0020] This polyoxyalkylene polymer (B) has a hydrolytic silicon group expressed with an end or a side chain of a chain with a following formula (1).



(R^1) is a univalent organic group substitution of the carbon numbers 1-20, or unsubstituted among a formula (1).

X is a hydroxyl group or a hydrolytic basis, and a is 1, 2, or 3.) however, when two or more R^1 exist, those R^1 may be the same, or may differ, and when two or more X exists, those X may be the same or may differ.

[0021] A hydrolytic silicon group expressed with a formula (1) is usually introduced into a raw material polyoxyalkylene polymer via an organic group. That is, as for a polyoxyalkylene polymer (B), it is preferred to have a basis expressed with a formula (2).



(A divalent organic group, R^1 , X, and a of R^0 are the same as that of the above among a formula (2).)

[0022] R^{fin} formula (1) (2) is a univalent organic group substitution of the carbon numbers 1-20, or unsubstituted. It is a with a carbon number of eight or less alkyl group, a phenyl group, or a fluoro alkyl group preferably, and they are a methyl group, an ethyl group, a propyl group, a butyl group, a hexyl group, a cyclohexyl group, a phenyl group, etc.

especially preferably. when two or more R^1 exist, those R^1 may be the same, or may differ.

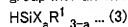
[0023] As a hydrolytic basis in X, a halogen atom, an alkoxy group, an acyloxy group, an alkenyloxy group, a carbamoyl group, an amino group, an aminooxy group, a KETOKISHI mate group, etc. are mentioned, for example.

[0024] As for a carbon number of a hydrolytic basis which has a carbon atom among these, six or less are preferred, and four especially or less are preferred. As desirable X, a with a carbon number of four or less alkoxy group, an alkenyloxy group especially a methoxy group, an ethoxy basis, a propoxy group, or a propenyloxy group can be illustrated. when two or more X exists, those X may be the same or may differ.

[0025] a is 1, 2, or 3. As for the number of hydrolytic silicon groups in one molecule of polymers, 1-8 are preferred, and 2-especially 6 are preferred.

[0026] Although a method in particular of introducing a hydrolytic silicon group to a raw material polyoxyalkylene polymer is not limited, it can be introduced, for example by (b) of the following - a method of (**).

[0027] (**) A method to which a hydrosilyl compound expressed with it by a formula (3) after introducing an olefin group into an end of a polyoxyalkylene polymer which has a hydroxyl group is made to react.

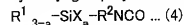


(R^1 , X, and a are the same as the above among a formula (3).)

[0028] A method of making a compound which has an unsaturation group and a functional group react to terminal hydroxyl groups of a polyoxyalkylene polymer which has a hydroxyl group, and combining it by ether bond, ester bond, a urethane bond, or carbonate combination as a method of introducing an olefin group, is mentioned. When polymerizing alkylene oxide, a method of introducing an olefin group into a side chain of a raw material polyoxyalkylene polymer can also be used by adding and carrying out copolymerization of the olefin group content epoxy compounds, such as allyl glycidyl ether.

[0029] When making a hydrosilyl compound react, catalysts, such as a platinum system catalyst, a rhodium system catalyst, a cobalt system catalyst, a palladium system catalyst, and a nickel series catalyst, can be used. Platinum system catalysts, such as chloroplatinic acid, platinum metal, a platinum chloride, and a platinum olefin complex, are preferred. As for a reaction to which a hydrosilyl compound is made to react, it is preferably preferred to carry out at temperature of 60-120 °C for several hours 30-150 °C.

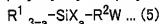
[0030] (**) A method to which a compound expressed with an end of a polyoxyalkylene polymer which has a hydroxyl group by a formula (4) is made to react.



(R^1 , X, and a are the same as the above among a formula (4).) R^2 is a divalent hydrocarbon group of the carbon numbers 1-17. A publicly known urethane-ized catalyst may be used in the case of the above-mentioned reaction. As for the above-mentioned reaction, it is preferably preferred to carry out at temperature of 50-150 °C for several hours 20-200 °C.

[0031] (**) A method to which W basis of a silicon compound expressed with a formula (5) to this isocyanate group is made to react after making polyisocyanate compounds, such as tolylene diisocyanate, react to an end of a

polyoxyalkylene polymer which has a hydroxyl group and considering it as an isocyanate group end.



(R^1 , R^2 , X, and a are the same as the above among a formula (5).) An active hydrogen containing group as which W is chosen from a hydroxyl group, a carboxyl group, a sulfhydryl group, and an amino group (the 1st class or the 2nd class).

[0032]** A method to which the olefin group and a sulfhydryl group of a silicon compound expressed with a formula (5) whose W is a sulfhydryl group are made to react after introducing an olefin group into an end of a polyoxyalkylene polymer which has a hydroxyl group.

[0033]W as a silicon compound expressed with a formula (5) which is a sulfhydryl group, 3-mercapto propyltrimethoxysilane, 3-mercapto propylmethyl dimethoxysilane, 3-mercaptopropyl dimethyl methoxysilane, 3-mercaptopropyl triethoxysilane, etc. are mentioned.

[0034]Polymerization initiators, such as a radical generator, may be used, and it may be made to react with radiation or heat in the case of the above-mentioned reaction, without using a polymerization initiator depending on the case. As a polymerization initiator, a polymerization initiator, a metal compound catalyst, etc. of a peroxide system, azo, or a redox system are mentioned, for example. Specifically as a polymerization initiator, 2,2'-azobisisobutyronitrile, 2,2'-azobis 2-methylbutyronitrile, benzoyl peroxide, t-alkyl peroxy ester, acetyl peroxide, diisopropyl peroxy carbonate, etc. are mentioned. As for the above-mentioned reaction, it is preferably preferred to carry out at 50-150 °C for several hours - tens hours 20-200 °C.

[0035](When a main chain is except a polyoxyalkylene polymer) When main chains of a polymer (A) are polyester and polycarbonate, it can manufacture by the same process as a polyoxyalkylene polymer (B) by using polyester of a hydroxyl group end, and polycarbonate of a hydroxyl group end as a raw material, respectively.

[0036]When a main chain is polyolefine, it can manufacture by the same process as a polyoxyalkylene polymer (B) by using polyolefine of hydroxyl group ends, such as a polybutadiene polyol and a hydrogenation polybutadiene polyol, as a raw material. After having used 1,4-bis(1-chloro-1-methylethyl)benzene as an initiator, making boron trichloride into a catalyst and polymerizing isobutylene. It can manufacture by the same process as a polyoxyalkylene polymer (B) by using a manufactured isobutylene system polymer which carried out the dehydrochlorination reaction and which has an isopropenyl group at the end as a raw material.

[0037](Hydrolytic silicon group whose a in a formula (1) is 3) It requires that a polymer (A) in this invention is a polymer in which all have "a hydrolytic silicon group whose a in a formula (1) is 3" (henceforth "a hydrolytic silicon group (E)") in part.

[0038]As "a hydrolytic silicon group (E)", especially a basis whose X in a formula (1) is a with a carbon number of four or less alkoxy group, i.e., bird alkoxy silyl groups which has a with a carbon number of four or less alkoxy group, is preferred. A polymer which has bird alkoxy silyl groups has dramatically high reactivity, and especially its early cure rate is dramatically quick.

[0039]Usually, in a hydrolysis reaction in a hydrolytic silicon group expressed with a formula (1), a silanol group is generated by a reaction with water (silanol group generating reaction expressed with $-SiX+H_2O \rightarrow -SiOH+HX$). It is thought that it progresses by the reaction (condensation reaction) for which the silanol groups furthermore produced condense condensation or a silanol group, and a hydrolytic silicon group, and they produce a siloxane bond. Once a silanol group occurs, it is thought that a condensation reaction goes smoothly. Bird alkoxy silyl groups has very quick reaction velocity in early stages of a silanol group generating reaction as compared with an alkyl dialkoxy silyl group or dialkyl alkoxy silyl groups. Therefore, it is thought that it has the effect that a hardenability constituent of this invention has short time until it reveals strength property sufficient in a short time and results especially in an adhesive manifestation.

[0040]A direction of bird alkoxy silyl groups which has an alkoxy group with a carbon number small among bird alkoxy silyl groups, Since reaction velocity in early stages of a silanol group generating reaction is quicker than bird alkoxy silyl groups which has an alkoxy group with a large carbon number, it is desirable. A trimethoxysilyl group and a triethoxy silyl group are more preferred, and since reaction velocity [in / in a trimethoxysilyl group / early stages of a silanol group generating reaction] is very quick, it is the most desirable. Therefore, it is most preferred that it is a trimethoxysilyl group as "a hydrolytic silicon group (E)." A rate of a hydrolytic silicon group (E) in a hydrolytic silicon group expressed with a formula (1) in a polymer (A) can be changed according to a use, the characteristic to need, etc.

[0041]When a polymer (A) is a polymer which has a hydrolytic silicon group (E) as this hydrolytic silicon group,

That is, when about 100% of hydrolytic silicon groups (namely, 80 to 100%) expressed with a formula (1) in a polymer (A) are hydrolytic silicon groups (E), it is effective in a cure rate being large, and a room-temperature-curing nature constituent excellent in especially hardenability that results in an adhesive manifestation is obtained. In this case, it is preferred that 95 to 100% is a hydrolytic silicon group (E) especially 90 to 100% of a hydrolytic silicon group (E) expressed with a formula (1).

[0042]When a hydrolytic silicon group and a hydrolytic silicon group (E) whose a in a formula (1) is 1 or 2 are intermingled, a room-temperature-curing nature constituent which may be compatible in a good extension characteristic and fast curability is obtained.

[0043]In this case, it is preferred that the percentage of a hydrolytic silicon group (E) in all the hydrolytic silicon groups expressed with a formula (1) in a polymer (A) is 5 to 80%. The characteristic according to a demand is freely controllable by changing this rate arbitrarily. That is, when the percentage of a hydrolytic silicon group (E) is 5 to 50%, while raising hardenability, a good extension characteristic and pliability which are needed by sealant etc. can be provided. When the percentage of a hydrolytic silicon group (E) is 50 to 80%, an extension characteristic needed for elastic adhesives etc. can fully be secured, and hardenability can be improved by leaps and bounds.

[0044]As for hydrolytic silicon groups other than a hydrolytic silicon group (E), in a hydrolytic silicon group expressed with a formula (1), it is preferred that a in a formula (1) is especially a hydrolytic silicon group of 2. It is preferred that it is especially a dialkoxy alkyl silyl group which has a with a carbon number of four or less alkoxy group. A dimethoxymethyl silyl group is the most preferred.

[0045]There are following method (**) and (**) in the method of obtaining a polymer (A) that the hydrolytic silicon group which is 1 or 2, and the hydrolytic silicon group (E) were intermingled, for example, and a in a formula (1) may use the method of (**) and (**) together.

(**) As a polymer (A), a in a formula (1) uses the polymer which has simultaneously the hydrolytic silicon group and hydrolytic silicon group (E) which are 1 or 2.

(**) As a polymer (A), a in a formula (1) uses both polymers (A) which has the polyoxyalkylene polymer (B) and hydrolytic silicon group (E) which have a hydrolytic silicon group which is 1 or 2.

[0046]As for the molecular weight of a polymer (A), although the molecular weight of the polymer (A) in this invention can choose a suitable value according to the use used, it is preferred that it is 8000-50000.

[0047]For uses, such as sealant than to which greater importance is attached to pliability, the polymer of the molecular weights 8000-50000 is preferred. As for a molecular weight, it is preferred that it is especially 8000-25000, and it is most preferred that it is 12000-20000. For the use of the adhesives etc. with which intensity is demanded, the polymer of the molecular weights 8000-30000 is preferred. When becoming what has a hardened material weak when lower than 8000 and exceeding 30000, workability gets remarkably bad for hyperviscosity. As for a molecular weight, it is more preferred that it is 8000-20000, and it is preferred that it is especially 12000-20000.

[0048](Polymer (D) produced by polymerizing a polymerization nature unsaturation group content monomer (C)) A room-temperature-curing nature constituent which uses a polymer (A) as an essential ingredient is excellent in hardenability. In this invention, when using a polyoxyalkylene polymer (B) among polymers (A), it is preferred that a polyoxyalkylene polymer (B) contains a polymer (D) produced by polymerizing a polymerization nature unsaturation group content monomer (C) further. By containing a polymer (D), an effect of adhesive grant in an initial stage of a hardening reaction, i.e., an effect that time until it reveals bond strength becomes very short, is acquired.

[0049]Although a compound shown, for example with a following formula (6) is mentioned as a typical thing of a polymerization nature unsaturation group content monomer (C), it is not limited to these.



(R, R³, R⁴, and R⁵ are a hydrogen atom, a halogen atom, or a univalent organic group independently among a formula, respectively.)

[0050]It is preferred that it is univalent substitution or an unsubstituted hydrocarbon group of the carbon numbers 1-10 as an organic group in R and R⁵. As for R and R⁵, it is more preferred respectively that it is a hydrogen atom.

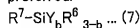
An organic group in R³ and R⁴ Univalent substitution or an unsubstituted hydrocarbon group of the carbon numbers 1-10, it is preferred that they are an alkoxy group, a carboxyl group, an alkoxy carbonyl group, a cyano group, a cyano group content group, an alkenyl group, an acyloxy group, a carbamoyl group, a pyridyl group, a glycidyloxy group, or a glycidyloxy carbonyl group. As for R³, it is preferred that it is especially univalent substitution or an unsubstituted hydrocarbon group of a hydrogen atom, a halogen atom, or the carbon numbers 1-

10.

[0051] As an example of a polymerization nature unsaturation group content monomer (C), Styrene monomers, such as styrene, alpha-methylstyrene, and chlorostyrene; Acrylic acid, Methacrylic acid, methyl acrylate, methyl methacrylate, ethyl acrylate, Ethyl methacrylate, butyl acrylate, butyl methacrylate, 2-ethylhexyl acrylate, Acrylic acid, such as 2-ethylhexyl methacrylate, acrylic acid benzyl, and benzyl methacrylate, Acrylic monomers, such as methacrylic acid or its ester, acrylamide, and methacrylamide; Acrylonitrile, Cyano group content monomers, such as 2,4-dicyano butene-1; Vinyl acetate, Vinyl ester system monomers, such as vinyl propionate; Butadiene, isoprene, Diene system monomers, such as chloroprene; Vinyl glycidyl ether, allyl glycidyl ether, Glycidyl group content monomer [such as methallyl glycidyl ether, glycidyl acrylate, and glycidyl methacrylate,]; and olefins other than these, unsaturation ester species, a halogenation olefin, vinyl ether, etc. are mentioned.

[0052] A polymerization nature unsaturation group content monomer (C) may use only one sort, and may use two or more sorts together. When a cyano group content monomer, a glycidyl group content monomer, or a styrene monomer is used and acrylonitrile, glycidyl acrylate, glycidyl methacrylate, or styrene is used especially, since the further outstanding adhesive property and mechanical physical property may be revealed, it is desirable. When requiring rubber elasticity especially after hardening, it is preferred to use acrylic ester.

[0053] The polymerization nature monomer which has a hydrolytic silicon group expressed with a formula (1) can be used as a polymerization nature unsaturation group content monomer (C). The compound expressed with a following formula (7) especially as a polymerization nature monomer which has such a hydrolytic silicon group is preferred.



(R^7 is a univalent organic group which has a polymerization nature unsaturation group among a formula (7), R^6 is a univalent organic group the substitution of the carbon numbers 1-20, or unsubstituted, Y is a hydroxyl group or a hydrolytic basis, and b is 1, 2, or 3.) however, when two or more R^6 exist, those R^6 may be the same, or may differ, and when two or more Y exists, those Y may be the same or may differ.

[0054] As a polymerization nature monomer which has a hydrolytic silicon group, the vinyl monomer which has a hydrolytic silicon group, the acrylic monomer which has a hydrolytic silicon group, etc. are mentioned. The following are specifically mentioned and 3-acryloyloxypropyl trimethoxysilane and especially 3-methacryloyl oxypropyl trimethoxysilane are preferred.

[0055] Vinylmethyldimethoxysilane, vinylmethyldiethoxysilane, vinyl methyldi chlorosilane, Vinyltrimethoxysilane, vinyltriethoxysilane, vinyl trichlorosilane, Vinylsilane, such as tris (2-methoxyethoxy) vinylsilane, 3-acryloyloxypropylmethyldimethoxysilane, 3-methacryloyl oxypropyl methyl dimethoxysilane, 3-acryloyloxypropyl trimethoxysilane, 3-acryloyloxypropyl triethoxysilane, Acryloyloxy silanes, such as 3-methacryloyl oxypropyl trimethoxysilane and 3-methacryloyl oxypropyl triethoxysilane, and methacryloyloxy silanes

[0056] A compound which has simultaneously a silicon atom which is a polysiloxane compound which has 2-30 silicon atoms other than these, for example, and was combined with a carbon-carbon double bond and a hydrolytic basis can also be used as a polymerization nature monomer which has a hydrolytic silicon group.

[0057] A polymerization nature monomer which has the above-mentioned hydrolytic silicon group may use only one sort, and may use two or more sorts together. When using a polymerization nature monomer which has a hydrolytic silicon group, this monomer has that preferred of *** for 0.01 - 20 weight sections among polymerization nature unsaturation group content monomer (C) 100 weight section.

[0058] As for a part or all of a polymerization nature unsaturation group content monomer (C), it is preferred that it is a monomer which has a hydrolytic silicon group which has a polymerization nature unsaturation group and is expressed with a glycidyl group and/or a formula (1).

[0059] (Polymer composition) When a polyoxyalkylene polymer (B) contains a polymer (D) further, a polymer composition which consists of a polyoxyalkylene polymer (B) and a polymer (D) can be manufactured by a method of (**) shown below - (**).

[0060] (**) How to mix a polymer (D) produced by polymerizing a polymerization nature unsaturation group content monomer (C) beforehand with a polyoxyalkylene polymer (B).

(**) How to polymerize a polymerization nature unsaturation group content monomer (C) in a polyoxyalkylene polymer (B).

(**) How to change an unsaturation group in a polymer (F) which remains into a hydrolytic silicon group expressed with a formula (1) after polymerizing a polymerization nature unsaturation group content monomer (C) in a

- polyoxyalkylene polymer (F) containing an unsaturation group. A converting method of a method to which a hydrosilyl compound expressed with an unsaturation group by a formula (3) is made to react is preferred.
- (**) How to change a precursor into a polyoxyalkylene polymer (B) after polymerizing a polymerization nature unsaturation group content monomer (C) in a precursor of a polyoxyalkylene polymer (B).
- (**) How to mix with a polyoxyalkylene polymer (B), rank second if needed, and distill off a solvent or a diluent after polymerizing a polymerization nature unsaturation group content monomer (C) under existence of a solvent or a diluent.
- [0061] A solvent can be suitably chosen according to a kind of polymerization nature unsaturation group content monomer (C). As a diluent, an unsaturation group content polyoxyalkylene polymer (F) is preferred. A polyoxyalkylene polymer (F) containing an unsaturation group can also be made to exist in a solvent or a diluent in the case of a polymerization.
- [0062] Polymerization initiators, such as a radical generator, may be used, and it may be made to polymerize with radiation or heat in the case of a polymerization nature unsaturation group content monomer (C) polymerization, without using a polymerization initiator depending on the case. About a polymerization initiator, polymerization temperature, and polymerization time, it is the same as said (**) described.
- [0063] When using a polymer (D) in this invention, it is preferred that the polyoxyalkylene polymer (B) / polymer (D) is used in the range used as $100 / 1 - 1/300$ at a weight ratio. It is preferred to be used in $100 / 1 - 1/100$, further $100 / 1 - 1/10$ especially in respect of workability etc.
- [0064] It may be distributing uniformly in the shape of a particle in a polyoxyalkylene polymer (B), or a polymer (D) may be dissolving uniformly again. When viscosity and workability of a constituent are taken into consideration, it is preferred to distribute uniformly in the shape of a particle.
- [0065] In this invention, a curing-in-air compound (K) and/or a photoresist compound (L) are used with a polymer (A). Use of a curing-in-air compound (K) has an effect in improvement of an initial tack, and use of a photoresist compound (L) has an effect in improvement of resistance to contamination or crack control. A curing-in-air compound (K) and a photoresist compound (L) have especially a preferred thing used together.
- [0066] The compound which has in intramolecular an unsaturation group which causes a polymerization by oxygen in the air as a curing-in-air compound (K) used for this invention is preferred. Specifically, the denaturation oil of the denaturation thing of drying oil and drying oil, a liquefied diene system polymer, or a liquefied diene system polymer is preferred.
- [0067] As drying oil, tung oil, linseed oil, perilla oil, soybean oil, sunflower seed oil, hempseed oil, etc. are mentioned. The various alkyd resins produced by denaturalizing drying oil as a denaturation thing of drying oil. The resultant of drying oil and functionality polyoxyalkylene, the resultant (urethane oil) of drying oil and an isocyanate compound, the acrylic polymer that denaturalized with drying oil, the epoxy resin which denaturalized with drying oil, and the silicon resin which denaturalized with drying oil are mentioned.
- [0068] As a liquefied diene system polymer and its denaturation thing, The diene series of the carbon numbers 4-8, such as butadiene, chloroprene, isoprene, and 1,3-pentadiene, homopolymerization or the liquefied polymer produced by making carry out copolymerization. Polymers, such as NBR, SBR, etc. which are produced by making carry out copolymerization of the monomers which have diene series and copolymer, such as acrylonitrile and styrene, so that diene series may serve as a subject, and those various denaturation things (a mallein-ized denaturation thing, a boiled oil denaturation thing, etc.) are mentioned.
- [0069] Among these, a denaturation thing of drying oil, a liquefied diene system polymer, and a liquefied diene system polymer is preferred. Especially drying oil is preferred. A curing-in-air compound (K) may be used by an one-sort independent, and may use two or more sorts together.
- [0070] Concomitant use of a catalyst and a metal drier which promote an oxidation hardening reaction with a curing-in-air compound (K) may heighten an effect. As these catalysts and metal driers, metal salt, such as cobalt naphthenate, lead naphthenate, a naphthenic acid zirconium, 2-ethylhexanoic acid cobalt, and 2-ethylhexanoic acid zirconium, an amine compound, etc. are mentioned.
- [0071] The amount of [in case used of using a curing-in-air compound (K)] has $0.01 - 20$ preferred weight section to a total of 100 weight sections of a polymer (A) or a polymer (A), and a polymer (D). If the amount used is less than 0.01 weight sections, an improvement effect of an initial tack which is the purpose of using a curing-in-air compound (K) is insufficient, and if 20 weight sections are exceeded, elongation of a hardened material, etc. will be spoiled. The desirable amount used is one to 10 weight section.
- [0072] By operation of light, considerably, molecular structure causes a chemical change for a short time, and a

photoresist compound (L) used for this invention produces physical-properties change of hardening etc. for it. As this kind of a compound, many things, such as a constituent containing a monomer, oligomer, resin, or them, are known, and arbitrary things marketed can be used. An unsaturation acrylic compound, polycinnamic acid vinyl, or azide-ized resin is typical, and especially an unsaturation acrylic compound is preferred.

[0073] as an unsaturation acrylic compound — an acrylyl group or a methacryloyl group — 1- monomers and oligomer which it has partly, or those mixtures are preferred, and a compound which has especially an acrylyl group is preferred. With a molecular weight of 10000 or less produced by more specifically polymerizing monomers and these monomers, such as di(meth)acrylate of polyhydric alcohol, oligoesters is preferred (acrylate shows acrylate and methacrylate.). (meta) It is below the same. As an example of di(meth)acrylate of polyhydric alcohol, Propyleneglycol di(meth)acrylate, butylene glycol di(meth)acrylate, ethylene glycol di(meth)acrylate, neopentyl glycol di(meth)acrylate, trimethylolpropane bird (meta) acrylate, etc. are mentioned.

[0074] The amount of [in case of using a photoresist compound (L)] has 0.01 - 20 preferred weight section to a total of 100 weight sections of a polymer (A) or a polymer (A), and a polymer (D). If the amount used is less than 0.01 weight sections, a contamination-resistant improvement which is the purpose of using a photoresist compound (L) is insufficient, and if 20 weight sections are exceeded, elongation of a hardened material, etc. will be spoiled. The desirable amount used is one to 10 weight section.

[0075] (Room-temperature-curing nature constituent) The following additive agent can also be included by room-temperature-curing nature constituent of this invention. Hereafter, an additive agent is explained.

[0076] (Bulking agent) A publicly known bulking agent can be used as a bulking agent. Especially the amount of bulking agent used has 50 - 250 preferred weight section 0.001 to 1000 weight section to a total of 100 weight sections of a polymer (A) or a polymer (A), and a polymer (D). The following are mentioned as an example of a bulking agent. These bulking agents may be used independently and may be used together two or more sorts.

[0077] Calcium carbonate which carried out the surface treatment of the surface with fatty acid or a resin acid system organic matter, Colloid calcium carbonate with a mean particle diameter of 1 micrometer or less which impalpable-powderized this calcium carbonate further, Calcium carbonate, such as precipitated calcium carbonate with a mean particle diameter of 1-3 micrometers manufactured with a sedimentation method, and heavy calcium carbonate with a mean particle diameter of 1-20 micrometers. Fumed silica, sedimentation nature silica, a silicic acid anhydride, hydrous silicic acids, and carbon black, Magnesium carbonate, diatomite, calcination clay, clay, talc, titanium oxide, bentonite, organic bentonite, ferric oxide, a zinc oxide, an active white, a milt balloon, glass balloons, wood flour, pulp, a cotton chip, mica, and blacking wash farina — rubbing — powder state bulking agents, such as farina, graphite, aluminum impalpable powder, and the Flint powder. Fibrous fillers, such as asbestos, glass fiber, a glass filament, carbon fiber, Kevlar fiber, and a polyethylene fiber.

[0078] (Plasticizer) A publicly known plasticizer can be used as a plasticizer. The amount of the plasticizer used has 0.001 - 1000 preferred weight section to a total of 100 weight sections of a polymer (A) or a polymer (A), and a polymer (D). The following are mentioned as an example of a plasticizer.

[0079] Phthalic ester, such as dioctyl phthalate, dibutyl phthalate, and phthalic acid benzyl butyl ester Aliphatic-carboxylic-acid ester, such as dioctyl adipate, a succinic acid screw (2-methylnonyl), dibutyl sebacate, and butyl oleate. Alcohol ester, such as pentaerythritol ester Phosphoric ester, such as trioctyl phosphate and tricresyl phosphate Epoxy plasticizers, such as epoxidized soybean oil, 4,5-epoxy hexahydrophthalic acid dioctyl, and epoxy stearic acid benzyl. Chlorinated paraffin. Polyester plasticizers, such as polyester dibasic acid and dihydric alcohol are made to come to react. Polyether, such as a polyoxypropylene glycol and its derivative. Polymeric plasticizers, such as oligomer, such as the oligomer of styrene systems, such as Polly alpha-methylstyrene and polystyrene, polybutadiene, Butadiene Acrylonitrile, polychloroprene, polyisoprene, polybutene, hydrogenation polybutene, and epoxidation polybutadiene.

[0080] (Hardening accelerator catalyst) When stiffening a hardenability constituent in this invention, a hardening accelerator catalyst which promotes a hardening reaction of a hydrolytic basis content silicon group may be used. The following compound is mentioned as a concrete example. Those one sort or two sorts or more are used. As for a hardening accelerator catalyst, it is preferred to carry out 0.001-10 weight-section use to a total of 100 weight sections of a polymer (A) or a polymer (A), and a polymer (D).

[0081] Metal salt, such as an alkyl titanate, an organic silicon titanate, and bismuth tris-2-ethylhexoate, Acidic compounds, such as phosphoric acid, p-toluenesulfonic acid, and phthalic acid, a butylamine, Aliphatic series monoamines, such as hexylamine, octylamine, decyl amine, and lauryl amine, Aliphatic diamine, such as ethylenediamine and a hexanediamine, diethylenetriamine, Aliphatic polyamine, such as triethylenetetramine and

tetraethylenepentamine. Amine compounds, such as aromatic amine, such as heterocyclic amine, such as piperidine and a piperazine, and a meta-phenylenediamine, ethanalamines, triethylamine, and various denaturation amine used as a hardening agent of an epoxy resin. A divalent tin compound and a mixture of the above-mentioned amines of 2-ethylhexanoic acid tin, naphthenic acid tin, stearic acid tin, etc.

[0082] Dibutyltin diacetate, dibutyltin dilaurate, dioctyltin dilaurate, the following carboxylic type organotin compound, and the mixture of these carboxylic type organotin compounds and the above-mentioned amines. $(n-C_4H_9)_2Sn(OCOCH=CHCOOCH_3)_2$, $(n-C_4H_9)_2Sn(OCOCH=CHCOOC_4H_9-n)_2$, $(n-C_8H_{17})_2Sn(OCOCH=CHCOOCH_3)_2$, $(n-C_8H_{17})_2Sn(OCOCH=CHCOOC_4H_9-n)_2$, $(n-C_8H_{17})_2Sn(OCOCH=CHCOOC_8H_{17}-iso)_2$.

[0083] The following sulfur-containing mold organotin compound. $(n-C_4H_9)_2Sn(SCH_2COO)$ and $(n-C_8H_{17})_2Sn(SCH_2COO)$, $(n-C_8H_{17})_2Sn(SCH_2CH_2COO)$, $(n-C_8H_{17})_2Sn(SCH_2COOCH_2CH_2OCOCH_2S)$, $(n-C_4H_9)_2Sn(SCH_2COOC_8H_{17}-iso)_2$, $(n-C_8H_{17})_2Sn(SCH_2COOC_8H_{17}-iso)_2$, $(n-C_8H_{17})_2Sn(SCH_2COOC_8H_{17}-n)_2$, and $(n-C_4H_9)_2SnS$.

[0084] $(n-C_4H_9)_2SnO$, $(n-C_8H_{17})_2SnO$, etc. and these organic tin oxide, and an ester compound. As an ester compound, ethyl silicate, dimethyl maleate, a diethyl maleate, dioctyl maleate, dimethyl phthalate, diethyl phthalate, dioctyl phthalate, etc. are mentioned.

[0085] Chelate tin compounds, such as the following, and a resultant of these tin compounds and alkoxysilane (however, acac expresses an acetylacetonate ligand). $(n-C_4H_9)_2Sn(acac)_2$, $(n-C_8H_{17})_2Sn(acac)_2$, and $(n-C_4H_9)_2(C_8H_{17}O)Sn(acac)$.

[0086] The following tin compound. $(n-C_4H_9)_2(CH_3COO)SnOSn(OCOCH_3)(C_4H_9-n)_2$, $(n-C_4H_9)_2(CH_3O)SnOSn(OCH_3)(C_4H_9-n)_2$.

[0087] (Adhesive grant agent) An adhesive grant agent is used in order to improve an adhesive property further. As these adhesive grant agents, silane coupling agents, such as (meth)acryloyloxy group content Silang, amino group content Silang, sulfhydryl group content Silang, epoxy group content Silang, and carboxyl group content Silang, are mentioned.

[0088] As (meth)acryloyloxy group content Silang, 3-methacryloyl oxypropyl trimethoxysilane, 3-acryloyloxypropyl trimethoxysilane, 3-methacryloyl oxypropyl methyl dimethoxysilane, etc. are mentioned.

[0089] As amino group content Silang, 3-aminopropyl trimethoxysilane, 3-aminopropyl triethoxysilane, 3-aminopropyl methyl dimethoxysilane, N-(2-aminoethyl)-3-aminopropyl trimethoxysilane, N-(2-aminoethyl)-3-aminopropyl methyl dimethoxysilane, N-(2-aminoethyl)-3-aminopropyl triethoxysilane, 3-ureido propyl triethoxysilane, N-(N-vinylbenzyl 2-aminoethyl)-3-aminopropyl trimethoxysilane, 3-anilino propyltrimethoxysilane, etc. are mentioned.

[0090] As sulfhydryl group content Silang, 3-mercapto propyltrimethoxysilane, 3-mercapto propyl triethoxysilane, 3-mercapto propylmethyl dimethoxysilane, 3-mercapto propylmethyl diethoxysilane, etc. are mentioned.

[0091] As epoxy group content Silang, 3-glycidyloxypropyl trimethoxysilane, 3-glycidyloxy propylmethyl dimethoxysilane, 3-glycidyloxy propyl triethoxysilane, etc. are mentioned.

[0092] As carboxyl group content Silang, 2-carboxyethyl triethoxysilane, 2-carboxyethyl phenylbis(2-methoxyethoxy)Silang, N-(N-carboxymethyl 2-aminoethyl)-3-aminopropyl trimethoxysilane, etc. are mentioned.

[0093] A reactant produced by making two or more sorts of silane coupling agents react may be used. As an example of a reactant, a reactant of amino group content Silang and epoxy group content Silang, A reactant of amino group content Silang and (meth)acryloyloxy group content Silang, a reactant of epoxy group content Silang and sulfhydryl group content Silang, a reactant of sulfhydryl group content Silang, etc. are mentioned. These reactants are easily obtained by mixing this silane coupling agent and agitating in a room temperature -150 °C temperature requirement for 1 to 8 hours.

[0094] The above-mentioned compound may be used alone and may be used together two or more kinds. The amount of silane coupling agent used has 0 - 30 preferred weight section to a total of 100 weight sections of a polymer (A) or a polymer (A), and a polymer (D).

[0095] An epoxy resin may be added as an adhesive grant agent. An epoxy resin hardener may be further used together if needed. A common epoxy resin is mentioned as an epoxy resin which can be added to a constituent of

this invention. Specifically, the following can be illustrated. 0 – 100 weight section of the amount used is preferred to a total of 100 weight sections of a polymer (A) or a polymer (A), and a polymer (D).

[0096]A bisphenol A-diglycidyl ether type epoxy resin, a bisphenol F-diglycidyl ether type epoxy resin, Fire retardancy type epoxy resins, such as a tetrabromobisphenol A-glycidyl ether type epoxy resin, Novolak type epoxy resin, a hydrogenation bisphenol A type epoxy resin, A glycidyl ether type epoxy resin of a bisphenol A-propylene oxide addition, 4-glycidyloxy benzoic acid glycidyl, phthalic acid diglycidyl, Diglycidyl ester system epoxy resins, such as tetrahydrophthalic acid diglycidyl and hexahydrophthalic acid diglycidyl, m-aminophenol series epoxy resin, a diaminodiphenylmethane system epoxy resin, Urethane modified epoxy resin, various cycloaliphatic-epoxy-resin, N, and N-diglycidyl aniline, N,N-diglycidyl o-toluidine, triglycidyl isocyanurate, A vinyl-base polymer containing epoxy resins currently generally used and epoxy groups, such as an epoxidation thing of unsaturation polymers, such as glycidyl ether of polyhydric alcohol, such as polyalkylene glycol diglycidyl ether and glycerin, a hydantoin type epoxy resin, and petroleum resin, etc.

[0097]A hardening agent (or curing catalyst) of the above-mentioned epoxy resin may be used together to a constituent of this invention. A hardening agent for epoxy resins generally used as such a hardening agent is mentioned. Specifically, the following can be illustrated. 0.1 to 300 weight section of the amount used is preferred to an epoxy resin.

[0098]Triethylenetetramine, tetraethylenepentamine, diethylamino propylamine, N-aminoethyl piperazine, m-xylylene diamine, m-phenylenediamine, Diaminodiphenylmethane, diaminodiphenyl sulfone, isophoronediamine, Amines or those salts, such as 2,4,6-tris(dimethyl aminomethyl) phenol, Or blocked amines, such as a ketimine compound, polyamide resin, Imidazole derivatives, dicyandiamides, and boron trifluoride complex compounds. Phthalic anhydride, a hexahydrophthalic anhydride, a tetrahydrophthalic anhydride, Carboxylic anhydrides, such as a dodecenyl succinic acid anhydride and a pyromellitic anhydride, phenoxy resin, carboxylic acid, alcohols, and a polyalkylene oxide system polymer (an end amination polyoxypropylene glycol.) that averages a basis which can react to an epoxy group and it has at least one piece in intramolecular Liquefied end functional group content polymers, such as an end carboxylation polyoxypropylene glycol, etc. polybutadiene in which an end was embellished with a hydroxyl group, a carboxyl group, an amino group, etc., hydrogenation polybutadiene, an acrylonitrile butadiene copolymer, and an acrylic polymer etc.

[0099](Solvent) When using a constituent of this invention as a hardenability constituent again, a solvent can also be added for the purpose of adjustment of viscosity, and improvement in preservation stability of a constituent. The amount of solvent used has 0.001 – 500 preferred weight section to a total of 100 weight sections of a polymer (A) or a polymer (A), and a polymer (D).

[0100]As a solvent, aliphatic hydrocarbon, aromatic hydrocarbon, and halogenated hydrocarbon. Alcohols, ketone, ester species, ether, ester alcohols, ketone alcohol, ether alcohol, ketone ether, ketone ester species, and ester ether can be used. When saving a constituent of this invention at a long period of time, since preservation stability of alcohols improves, they are preferred. As alcohols, alkyl alcohol of the carbon numbers 1-10 is preferred, and methanol, ethanol, isopropanol, isopentyl alcohol, especially hexyl alcohol, etc. are preferred.

[0101](Dehydrator) In order to improve the storage stability of a hardenability constituent of this invention further again, a little dehydrators can be added in the range which has an adverse effect on neither hardenability nor pliability. The amount of dehydrator used has 0.001 – 30 preferred weight section to a total of 100 weight sections of a polymer (A) or a polymer (A), and a polymer (D).

[0102]Specifically ORUTOGI acid alkyls, such as methyl orthoformate and ethyl orthoformate, Hydrolytic organic silicon compounds, such as alt.acetic acid alkyls, such as alt.methyl acetate and alt.ethyl acetate, methyl trimetoxysilane, vinyltrimetoxysilane, a tetramethoxy silane, and a tetraethoxysilane, a hydrolytic organic titanium compound, etc. can be used. Vinyltrimetoxysilane and a tetraethoxysilane are preferred especially from a point of cost and an effect.

[0103](Thixotropy grant agent) A thixotropy grant agent may be used again for the improvement of lappet nature. As such a thixotropy grant agent, hydrogenation castor oil, fatty acid amide, etc. are used.

[0104](Antianging agent) As an antiaging agent, the antioxidant generally used, an ultraviolet ray absorbent, and light stabilizer are used suitably again. Each compound of a hindered amine system, a benzotriazol system, a benzophenone series, a benzoate system, a cyanoacrylate system, an acrylate system, a hindered phenol system, a phosphorus system, and sulfur systems can be used suitably.

[0105](in addition to this) As paints, organic colors, such as inorganic pigments, such as iron oxide, chrome oxide, and titanium oxide, and copper phthalocyanine blue, and Phthalocyanine Green, are mentioned.

[0106]The room-temperature-curing nature constituent of this invention is suitable for the use as which it can be used for sealant, a water blocking material, adhesives, a coating agent, etc., and the dynamic flattery nature to the sufficient cohesive force and adherend of especially the hardened material itself is required.

[0107]

[Working example]The embodiment and comparative example which produced the hardened material are shown below using the polymer (P1-P23) manufactured in the examples 1-23 of manufacture. A part shows a weight section. In the examples 1-13 of manufacture, a hydroxyl value conversion molecular weight shows the molecular weight converted from the hydroxyl value of the polyoxyalkylene polymer which has a hydroxyl group which is a raw material. M_w/M_n is the value measured by the gel permeation chromatograph using a tetrahydrofuran as a solvent. The analytical curve was prepared using the polyoxyalkylene polyol. In the examples 14-17 of manufacture, the molecular weight was measured by the gel permeation chromatograph, using a tetrahydrofuran as a solvent. The analytical curve was prepared using polystyrene.

[0108](Example 1 of manufacture) Glycerin was used as the initiator and the bottom propylene oxide of existence of a zinc hexa cyanocobaltate glyme complex compound catalyst was made to react. The methanol solution of sodium methoxide was added to the polypropylene oxide of hydroxyl value conversion molecular weight 17000 and $M_w/M_n=1.3$, scale loss draft methanol was distilled off, and the terminal hydroxyl groups of polypropylene oxide was changed into sodium alcoholate. Next, the allyl chloride was made to react. The unreacted allyl chloride was removed and refined and allyl group end polypropylene oxide was obtained (let this be the polymer U1.). When the hydroxyl group which remains was analyzed by the measuring method of the hydroxyl value, they were 0.01 millimol /g. The trimethoxysilane which is a hydrosilyl compound was made to react under existence of a platinum catalyst to the polymer U1, and the polymer P1 which has an average of two trimethoxysilyl groups at the end was obtained.

[0109](Example 2 of manufacture) Polypropylene oxide of hydroxyl value conversion molecular weight [which used propylene glycol as an initiator, made bottom propylene oxide of existence of a zinc hexa cyanocobaltate glyme complex compound catalyst react, and was obtained] 17000, and $M_w/M_n=1.3$ is used, Polypropylene oxide which has an allyl group at the end by the same method as the example 1 of manufacture was obtained (hydroxyl groups which remain are 0.01 millimols /g). Trimethoxysilane which is a hydrosilyl compound was made to react under existence of a platinum catalyst to this reactant, and the polymer P2 which has an average of 1.3 trimethoxysilyl groups at the end was obtained.

[0110](Example 3 of manufacture) Polypropylene oxide of hydroxyl value conversion molecular weight [which used sorbitol as an initiator, made bottom propylene oxide of existence of a zinc hexa cyanocobaltate glyme complex compound catalyst react, and was obtained] 15000, and $M_w/M_n=1.3$ is used, Polypropylene oxide which has an allyl group at the end by the same method as the example 1 of manufacture was obtained (hydroxyl groups which remain are 0.01 millimols /g). Trimethoxysilane which is a hydrosilyl compound was made to react under existence of a platinum catalyst to this reactant, and the polymer P3 which has an average of 3.9 trimethoxysilyl groups at the end was obtained.

[0111](Example 4 of manufacture) The mixture which made the mole ratio methyl dimethoxysilane and trimethoxysilane which are hydrosilyl compounds, and was mixed in proportion of 30 to 70 is made to react under existence of a platinum catalyst to the polymer U1 manufactured in the example 1 of manufacture, The polymer P4 which has simultaneously an average of 0.6 methyl dimethoxy silyl group and an average of 1.4 trimethoxysilyl groups at the end was obtained.

[0112](Example 5 of manufacture) 3-mercapto propyl(trimethoxysilane which is a silyl compound to the polymer U1 manufactured in the example 1 of manufacture, It was made to react using the 2,2'-azobis 2-methylbutyronitrile which is a polymerization initiator, and the polymer P5 which has an average of two trimethoxysilyl groups at the end was obtained.

[0113](Example 6 of manufacture) It refined, after polymerizing propylene oxide using the zinc hexa cyanocobaltate catalyst by having used glycerin as the initiator and obtaining polyoxypropylene triol of hydroxyl value conversion molecular weight 17000 and $M_w/M_n=1.3$. Isocyanate propyl(trimethoxysilane was added to this, the urethane-ized reaction was performed, both ends were changed into the trimethoxysilyl group, and the polymer P6 of the molecular weight 18000 which has an average of two trimethoxysilyl groups at the end was obtained.

[0114](Example 7 of manufacture) To the polymer U1 manufactured in the example 1 of manufacture, methyl dimethoxysilane which is a hydrosilyl compound was made to react under existence of a platinum catalyst, and the

polymer P7 which has an average of two methyl dimethoxy silyl groups at the end was obtained.

[0115](Example 8 of manufacture) Except using methyldiethoxysilane instead of methyl dimethoxysilane as a hydrosilyl compound in the example 7 of manufacture, it carried out like the example 7 of manufacture, and the polymer P8 which has an average of two methyldi ethoxy silyl groups at the end instead of the polymer P7 was obtained.

[0116](Example 9 of manufacture) Polypropylene oxide of hydroxyl value conversion molecular weight [which used propylene glycol as an initiator, made bottom propylene oxide of existence of a zinc hexa cyanocobaltate glyme complex compound catalyst react, and was obtained] 7000, and $M_w/M_n=1.2$ is used, Polypropylene oxide which has an allyl group at the end by the same method as the example 1 of manufacture was obtained (hydroxyl groups which remain are 0.01 millimols /g). Methyl dimethoxysilane which is a hydrosilyl compound was made to react under existence of a platinum catalyst to this reactant, and the polymer P9 which has an average of 1.3 methyl dimethoxy silyl groups at the end was obtained.

[0117](Example 10 of manufacture) Polypropylene oxide of hydroxyl value conversion molecular weight [which used propylene glycol as an initiator, made bottom propylene oxide of existence of a zinc hexa cyanocobaltate glyme complex compound catalyst react, and was obtained] 7000, and $M_w/M_n=1.2$ is used, Polypropylene oxide which has an allyl group at the end by the same method as the example 1 of manufacture was obtained (hydroxyl groups which remain are 0.01 millimols /g). Trimethoxysilane which is a hydrosilyl compound was made to react under existence of a platinum catalyst to this reactant, and the polymer P10 which has an average of 1.3 trimethoxysilyl groups at the end was obtained.

[0118](Example 11 of manufacture) Methanol solution of sodium methoxide was added to polyoxypropylene diol of the hydroxyl value conversion molecular weight 3000 obtained using a potassium hydroxide catalyst, scale loss draft methanol was distilled off, and terminal hydroxyl groups was changed into sodium alcoholate. Next, an allyl chloride was made to react continuously, after making it react to chlorobromomethane and performing polymer quantification. An unreacted allyl chloride was removed and refined and polypropylene oxide ($M_w/M_n=1.9$) which has an allyloxy group at the end was obtained (hydroxyl groups which remain are 0.01 millimols /g). The polymer P11 of the molecular weight 7000 which makes trimethoxysilane which is a hydrosilyl compound react to this under existence of a platinum catalyst, and has an average of 1.3 trimethoxysilyl groups at the end was obtained.

[0119](Example 12 of manufacture) Polyoxypropylene diol of hydroxyl value conversion molecular weight [which was obtained using a potassium hydroxide catalyst] 6000 and $M_w/M_n=1.9$ is used, Polypropylene oxide which has an allyloxy group at the end by the same method as the example 1 of manufacture was obtained (hydroxyl groups which remain are 0.01 millimols /g). Trimethoxysilane which is a hydrosilyl compound was made to react to this under existence of a platinum catalyst, and the polymer P12 which has an average of 1.3 trimethoxysilyl groups at the end was obtained.

[0120](Example 13 of manufacture) To the polymer U1 manufactured in the example 1 of manufacture, triethoxysilane which is a hydrosilyl compound was made to react under existence of a platinum catalyst, and the polymer P13 which has an average of two triethoxy silyl groups at the end was obtained.

[0121](Embodiments 1-20 and comparative examples 1-4) Inside of the polymers P1-P13, To 100 copies of polymers shown in Tables 1-3, 100 copies of fatty acid surface treatment calcium carbonate, 50 copies of heavy calcium carbonate, and a plasticizer shown in Tables 1-3 50 copies or zero copy, An ultraviolet ray absorbent, a hindered amine light stabiliser, and an antioxidant which are shown in thioxotropy grant agent 3 copy and Tables 1-3 One copy each, Five copies of curing-in-air compounds, three copies of photoresist compounds shown in Tables 1-3, a thing which mixed 0.7 copy of lauryl amine with two copies of 2-ethylhexane tin beforehand as a curing catalyst, or two copies of dibutyltin bisacetylacetonate was added, it mixed uniformly, and a hardenability constituent was obtained.

[0122]Time for constituent viscosity to reach 1,600,000 cps under 20 **65% humidity conditions was measured for inner-drying-property evaluation of this constituent. It was recuperated under 50 ** and 60% humidity under 20 ** and 65% humidity in a mullied constituent on the 7th on the 7th, and a 5-mm-thick sheet was obtained. The surface weatherability 250 hours after this sheet and of 500 hours and 750 hours after was investigated with a sunshine weatherometer. Evaluation made ** what O and a hair crack are accepted to in what a surface crack is not accepted to after a sunshine weatherometer examination, and made x what a crack is clearly accepted to. A result is shown in Table 1 - 3.

[0123](End group of a polymer)

TM: A trimethylsilyl group, DM: methyl dimethoxy-silyl group, TE: triethoxy-silyl group, DE: A methyl dimethoxy silyl group.

[0124](Curing-in-air compound)

A: Tung oil, B: polymerization tung oil (***** No. 4), C: urethane oil (UO-5), D: linseed-oil conversion alkyd (HL-20) (A-D: the TOMEN Chemical Co. article), and E: liquid polybutadiene R-15HT (product made from Idemitsu Petrochemistry).

[0125](Photoresist compound)

A: ARONIKUSU M309, B: M400, C: M8060 (A-C: made by Toagosei), D: KAYARAD (made by Nippon Kayaku Co., Ltd.), E: acrylic acid fluoro alkyl ($C_8F_{17}C_2H_4$) ester, F: acrylic acid fluoro alkyl ($C_8F_{17}C_3H_5$) ester (E, F: made by

Asahi Glass Co., Ltd.).

[0126](Ultraviolet ray absorbent)

A: The tinuvin 3277, B: tinuvin 213 (A, B: Tiba Speciality Chemicals article).

[0127](Hindered amine light stabiliser)

ADEKA stub LA-52, B: ADEKA stub LA-62, C: ADEKA stub LA-67, D: A: ADEKA stub LA63P (A-D: made by Asahi Denka Kogyo K.K.), E: The tinuvin 144, F: the tinuvin 765, G: CHIMASSOPB119 floor line (E-G: made in Tiba Speciality Chemicals), H: SANORULS765 (H: made by Sankyo Co., Ltd.).

[0128](Antioxidant)

A: Styrene-ized phenol (NOKURAKKU SP, Ouchi Shinko Chemical), B: 2,6-di-tert-butyl-4-methylphenol, C: IRUGA NOx 245 (B, C: made in Tiba Speciality Chemicals).

[0129](Plasticizer)

A: Di-(2-ethylhexyl)phthalate, B: polyoxypropylene glycol end allyl ether of the molecular weight 10000, C: 4,5-epoxy cyclohexanedicarboxylic acid di(2-ethylhexyl).

[0130](Curing catalyst)

A: A mixture of octylic acid tin and lauryl amine, B: dibutyltin bisacetylacetonate.

[0131](Example 14 of manufacture) Based on a method indicated to JP,1-170681,A, 1,4-bis(1-chloro-1-methylethyl)benzene is used as an initiator. A molecular weight which has an isopropenyl group at a rate of about 92% in both ends which polymerized isobutylene by making boron trichloride into a catalyst, and which carried out back dehydrochlorination and were manufactured makes chloroplatinic acid with a catalyst an isobutylene system polymer of about 5000, and trichlorosilane is made to react in 90 ** 12 hours. The polyisobutylene system polymer P14 which has an average of 1.2 trimethoxysilyl groups at the end by making methanol react to methyl orthoformate furthermore was obtained.

[0132](Example 15 of manufacture) Based on a method indicated to JP,1-170681,A, 1,4-bis(1-chloro-1-methylethyl)benzene is used as an initiator. A molecular weight which has an isopropenyl group at a rate of about 92% in both ends which polymerized isobutylene by making boron trichloride into a catalyst, and which carried out back dehydrochlorination and were manufactured makes chloroplatinic acid with a catalyst an isobutylene system polymer of about 5000, and methyl di chlorosilane is made to react in 90 ** 12 hours. The polyisobutylene system polymer P15 which has an average of 1.2 methyl dimethoxy silyl groups at the end by making methanol react to methyl orthoformate furthermore was obtained.

[0133](Example 16 of manufacture) hydrogenation polybutadiene (polytail HA.) which has a hydroxyl group at the end 90-mol% of 3-isocyanate propyltrimethoxysilane was made to react to the Mitsubishi Chemical terminal hydroxyl groups, and the hydrogenation polybutadiene polymerization object P16 which has an average of 1.3 trimethoxysilyl groups at the end was acquired.

[0134](Example 17 of manufacture) hydrogenation polybutadiene (polytail HA.) which has a hydroxyl group at the end 90-mol% of 3-isocyanate propylmethyl dimethoxysilane was made to react to the Mitsubishi Chemical terminal hydroxyl groups, and the hydrogenation polybutadiene polymerization object P17 which has an average of 1.3 methyl dimethoxy silyl groups at the end was acquired.

[0135](Embodiments 21-27 and comparative examples 5-7) The inside of the polymers P14-P17, To 100 copies of polymers shown in Tables 4 and 5, 100 copies of colloid oilium carbonate, 40 copies of heavy calcium carbonate, 65 copies of hydrocarbon system retarder thinner (Nippon Oil Chemical industry high ZORU), Five copies of sodium sulfate hydrates, dripping stop agent 1 copy, five copies of curing-in-air compounds, three copies of photoresist compounds, one copy of ultraviolet ray absorbent, one copy of hindered amine light stabiliser, and one copy of antioxidant are added. The mixture of two copies of octylic acid tin and 0.7 copy of lauryl amine or two copies of dibutyltin bisacetylacetonate was mixed, and it was considered as the hardenability constituent.

[0136]The examination same about this constituent as Embodiments 1-20 was done. A result is shown in Tables 4 and 5.

[0137](Example 18 of manufacture) 100 g of the polymer P1 was put into the reactor with a churning group, and it heated at 100 **, and it added over 3 hours from the dropping funnel there, agitating the solution of 15 g of acrylonitrile, 15g of styrene, and 0.3 g of 2,2'-azobisisobutyronitrile. After continuing heating and stirring at 100 ** for further 2 hours, degassing operation was performed under decompression and the polymer mixture P18 of the letter of nebula was obtained.

[0138](Example 20 of manufacture) 50g of the polymer P1 and 50 g of the polymer P7 were put into the reactor with an agitator, and 50 g of toluene was added and diluted. Heat this mixture at 100 ** and 20 g of acrylonitrile, 20 g of styrene, The solution which dissolved the 2,2'-azobisisobutyronitriles 0 and 3g was dropped at 5 g of glycidyl methacrylate, and 2 g of 3-methacryloyl oxypropyl trimethoxysilane under churning over 3 hours. After the 2,2'-azobisisobutyronitriles [0 and 2g] toluene solution was dropped at the end of dropping back pan over 30 minutes, it heated and stirred at 100 ** for 3 hours. Toluene was distilled out of the obtained mixture under 100 ** decompression, and the polymer mixture P20 of the letter of nebula was obtained.

[0139](Example 22 of manufacture) 100 g of the polymer P13 was put into the reactor with an agitator. Heat this at 100 ** and 5 g of styrene, 10 g of methyl methacrylate, The solution which dissolved 7 g of butyl methacrylate, 2 g of methacrylic acid octadecyl, 18 g of 3-methacryloyl oxypropyl trimethoxysilane, and 0.5 g of 2,2'-azobisisobutyronitrile was dropped under churning over 3 hours. After the toluene solution of 0.2 g of 2,2'-azobisisobutyronitrile was dropped at the end of dropping back pan over 30 minutes, it heated and stirred at 100 ** for 3 hours. Toluene was distilled out of the obtained mixture under 100 ** decompression, and the polymer mixture P22 of the letter of nebula was obtained.

[0140](Example 23 of manufacture) The polymer P23 was manufactured like the example 22 of manufacture except replacing a raw material with the polymer P13, and using the polymer P8 (methyl di ethoxy silyl group end).

[0141](Embodiments 28-34 and comparative examples 8-10) The inside of the polymers P18-P23, To 100 copies of polymers shown in Tables 6 and 7, 100 copies of colloid calcium carbonate, 40 copies of heavy calcium carbonate, 30 copies of plasticizers or zero copy, five copies of sodium sulfate hydrates, Dripping stop agent 1 copy, five copies of curing-in-air compounds, three copies of photoresist compounds, one copy of ultraviolet ray absorbent, One copy of hindered amine light stabiliser and one copy of antioxidant were added, and further, the mixture of two copies of octylic acid tin and 0.7 copy of lauryl amine or two copies of dibutyltin bisacetylacetonate was mixed, and it was considered as the hardenability constituent. The examination same about this constituent as Embodiments 1-20 was done. A result is shown in Tables 6 and 7.

[0142]

[Table 1]

	実施 例1	実施 例2	実施 例3	実施 例4	実施 例5	実施 例6	実施 例7	実施 例8	実施 例9
重合体	P 1	P 1	P 1	P 1	P 1	P 1	P 1	P 1	P 2
重合体末端基	TM	TM	TM	TM	TM	TM	TM	TM	TM
空気酸化性 化合物	A	B	C	D	E	A	A	A	A
光酸化性 化合物	A	A	B	B	C	D	A+E (1:1)	A+F (1:1)	A
紫外線吸収剤	A	A	A	A	B	B	B	B	A
光安定剤	B	A	C	D	E	F	G	H	B
酸化防止剤	C	A	B	A	A	B	C	C	A
可塑剤	A+C (1:1)	A+C (1:1)	A+C (1:1)	A+C (1:1)	A+C (1:1)	A	A+C (1:1)	B	A+C (1:1)
硬化触媒	A	A	A	A	A	B	A	B	A
160万cps達成 時間(h)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
表面 250 hr	○	○	○	○	○	○	○	○	○
耐候 500 hr	○	○	○	○	○	○	○	○	○
性 750 hr	○	○	○	○	○	○	○	○	○

[0143]

[Table 2]

	実施 例10	実施 例11	実施 例12	実施 例13	実施 例14	実施 例15	実施 例16	実施 例17	実施 例18
重合体	P 3	P 4	P 5	P 6	P10	P11	P12	P13	P 1
重合体末端基	TM	TM/DM	TM	TM	TM	TM	TM	TE	TM
空気酸化性 化合物	A	A	A	B	B	B	B	B	A
光酸化性 化合物	A	A	A	A	A	A	A	A	A+F (1:1)
紫外線吸収剤	A	A	A	A	A	A	A	A	B
光安定剤	B	B	D	D	D	E	E	E	H
酸化防止剤	A	B	B	C	C	C	C	C	C
可塑剤	C (1:1)	C (1:1)	A+C (1:1)	A	A	B	B	B	なし
硬化触媒	A	A	A	B	B	B	B	B	B
160万cps達成 時間(h)	0.5	1	0.5	0.5	0.5	1.5	1.5	1	0.5
表面 250 hr	○	○	○	○	○	○	○	○	○
耐候 500 hr	○	○	○	○	○	○	○	○	○
性 750 hr	○	○	○	○	○	○	○	○	○

[0144]

[Table 3]

	実施 例 19	実施 例 20	比較 例 1	比較 例 2	比較 例 3	比較 例 4
重合体	P 1	P 1	P 7	P 8	P 9	P 1
重合体末端基	TM	TM	DM	DE	DM	TM
空気酸化性化合物	なし	A	A	B	B	なし
光酸化性化合物	A	なし	A	A	A	なし
紫外線吸収剤	A	A	A	A	A	A
光安定剤	B	B	B	E	D	B
酸化防止剤	C	C	C	C	C	C
可塑剤	A+C (1:1)	A+C (1:1)	A+C (1:1)	B	A	A+C (1:1)
硬化剤	A	A	A	B	B	A
180万cps達成時間 (h)	0. 5	0. 5	4	8	7	0. 5
表面 耐候性	250 hr 500 hr 750 hr	○ ○ △	○ ○ ○	○ ○ ○	○ ○ ○	△ △ △~×

[0145]

[Table 4]

	実施 例 21	実施 例 22	実施 例 23	実施 例 24	実施 例 25
重合体	P14	P14	P15	P14/P15 (1:1)	P14/P15 (1:1)
重合体末端基	TM	TM	TM	TM/TM	TM/TM
空気酸化性化合物	A	A	A	A	A
光酸化性化合物	A	A	A	A	A
紫外線吸収剤	A	A	A	A	A
光安定剤	B	B	B	B	B
酸化防止剤	C	C	C	C	C
硬化剤	A	B	A	A	B
180万cps達成時間 (h)	1	0. 5	1	2	1. 5
表面 耐候性	1000 hr 2000 hr 3000 hr	○ ○ ○	○ ○ ○	○ ○ ○	○ ○ ○

[0146]

[Table 5]

	実施 例 26	実施 例 27	比較 例 5	比較 例 6	比較 例 7
重合体	P14	P14	P15	P17	P14
重合体末端基	TM	TM	DM	DM	TM
空気硬化性化合物	なし	A	A	A	なし
光硬化性化合物	A	なし	A	A	なし
紫外線吸収剤	A	A	A	A	A
光安定剤	B	B	B	B	B
酸化防止剤	C	C	C	C	C
硬化触媒	A	B	A	A	A
160万cps達成時間 (h)	1	0.5	4.5	5	1
表面 耐候性	1000 hr ○	○	○	○	△
	2000 hr ○~△	○	○	○	△
	3000 hr △	△	○	○	×

[0147]

[Table 6]

	実施 例 28	実施 例 29	実施 例 30	実施 例 31	実施 例 32
重合体	P18	P18	P18	P20	P22
重合体末端基	TM	TM	TM	TM/DM	TE
空気硬化性化合物	A	B	B	A	B
光硬化性化合物	A	A	A	B	A
紫外線吸収剤	A	A	A	A	A
光安定剤	B	A	A	C	E
酸化防止剤	C	A	A	B	C
可塑剤	A+C (1:1)	B	なし	A+C (1:1)	B
硬化触媒	A	B	B	A	B
160万cps達成時間 (h)	0.5	0.5	0.5	0.5	0.5
表面耐 候性	250 hr ○	○	○	○	○
	500 hr ○	○	○	○	○
	750 hr ○	○	○	○	○

[0148]

[Table 7]

	実施 例 33	実施 例 34	比較 例 8	比較 例 9	比較 例 10
重合体	P18	P18	P21	P23	P18
重合体末端基	TM	TM	DM	DE	TM
空気硬化性化合物	なし	A	A	B	なし
光硬化性化合物	A	なし	B	A	なし
紫外線吸収剤	A	A	A	A	A
光安定剤	B	B	C	E	B
酸化防止剤	C	C	B	C	C
可塑剤	A+C (1:1)	A+C (1:1)	A+C (1:1)	B	A+C (1:1)
硬化触媒	A	A	A	B	A
160万cps塗布時間 (h)	0.5	0.5	3	4.5	0.5
表面耐 候性	250 hr ○	○	○	○	△
	500 hr △	○	○	○	○~△
	750 hr △	△	○	○	△~×

[0149]

[Effect of the Invention] The room-temperature-curing nature constituent of this invention has the effect of excelling in hardenability and surface weatherability extremely.

[Translation done.]